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(54) Title: IMPROVEMENTS TO TELEVISION AND RADIO PROGRAMME CONTROL

(57) Abstract: A system and method for controlling channel changes in television or digital radio having a tuner or receiver (12). The system comprises an enhanced zap mechanism (34) that is operable to monitor channel change commands received from a user over a zapping session, identify discarded channels and prevent the tuner or receiver (12) from returning to the discarded channels during the rest of the zapping session, unless it is determined that a programme transmitted on the discarded channel has changed.

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Improvements to Television and Radio Programme Control

The present invention relates to an improved system and method of channel scanning in television and/or radio systems.

5   Digital television can deliver hundreds of channels. Because of this, users need a simple and efficient method of navigating these channels. Electronic programme guides (EPGs) address this problem to an extent. However, despite the relatively

10   sophisticated functionality provided by EPGs, it seems that people continue to 'hop' or 'surf' or switch through the range of available channels using their remote controls. This is commonly referred to as "zapping". That is, viewers simply use the 'programme

15   up' and 'programme down' controls. Hence, a viewer may look through many, many channels before deciding to stop and watch something. If that item, or program, on that channel fails to interest the viewer, they re-start their search. A difficulty with this is that

20   they have to re-scan many channels again.

Channel zapping on a digital television also suffers from the problem that it can take a perceptible time to decode and, possibly, decrypt incoming signals, such as MPEG, DVB, ATSC or ARIB streams. Some channel changes

25   inevitably involve the changing of receiver frequency or polarisation. This means that the receiver has to begin demodulating a new radio frequency signal. These problems exist for all types of modulation, including COFDM, 8-VSB, QAM, etc. This means that the user experiences a

30   delay changing channels on a digital TV system, whereas an analogue system changes channel almost instantly. This can be particularly annoying for the user if they have to scan through numerous channels that they have already viewed.

An object of the invention is to provide improved channel scan functionality for television and digital radio.

According to one aspect of the present invention, there is provided a method for controlling channel changes in television or digital radio having a tuner or receiver, the method involving monitoring channel change commands received over a zapping session during which channels are discarded; identifying discarded channels; and preventing the tuner or receiver from returning to the discarded channels during the rest of the zapping session or unless it is determined that a program transmitted on the discarded channel has changed.

By preventing the tuner or receiver from returning to discarded channels that are of no interest to the user, redundant channel selections are removed from the zapping process. Hence, if a user has already 'channel hopped' to a particular channel, and the same item or programme is showing, then that channel will be excluded from the 'channel hopping' process during the zapping session.

The step of identifying discarded channels may involve monitoring a time for which the viewer viewed the channel and on the basis of this, determine whether the channel is discarded. The method may further involve setting a viewing time threshold for use in the step of determining whether the channel is to be discarded. Various options for using the threshold to determine whether or not a channel is to be discarded may be employed. The choice of which option to use can be made by the viewer or be pre-determined. For example, the method may involve discarding the channel if the monitored viewing time is at most the viewing

time threshold. Alternatively, if the monitored viewing time is at most the viewing time threshold, then the channel may be retained. Alternatively if the monitored viewing time is at least the viewing time

5   threshold, then the channel may be discarded. As a yet further alternative, if the monitored viewing time is at least the set viewing time threshold, then the channel may be retained.

The step of identifying discarded channels may

10 involve receiving from a user an indication of a programme or item type that is to be discarded; monitoring the type of programme currently being provided on available channels and discarding those channels that are currently broadcasting programmes or

15 items of the type indicated by the user. The programme type may be, for example, sports programmes or current affairs programmes or advertisements.

The method may further comprise determining whether a programme on a particular channel has

20 changed. The method of determining whether a programme has changed may involve comparing programme identifiers for the previously viewed programme and the programme currently available. In the event that there is a match, then it is determined that the programme has not

25 changed and so the channel is not re-introduced to a list of channels that are available for scanning. In the event that there is not a match, then it is determined that the programme has changed. In this case, the channel is re-introduced into the pool of

30 channels that can be zapped to.

Additionally or alternatively, the step of determining whether a programme on a particular channel has changed may involve monitoring real-time using for example a real time clock or timing information

included in a broadcast; identifying programme scheduling information for a particular channel and using the scheduling information and real-time to determine whether there is a change in the currently

5 broadcast programme.

The method may further involve receiving a control signal from the user that indicates that a channel zapping session is starting, this signal prompting the start of the step of monitoring the channels zapped to

10 and those discarded. This signal may be adapted so as to identify different users, so that, for example different family members can start new zapping sessions. The method may further involve receiving from a user a signal that is indicative of a command to

15 stop the channel zapping session.

The method may involve terminating the channel zapping session if no channel change commands are received over a pre-determined time.

The method may further involve identifying an

20 advertisement, temporarily excluding the channel that the advertisement is being shown on from the pool of available channels and re-introducing the channel when the advertisement is finished. Alternatively, the method may involve identifying an advertisement and

25 showing in place of the advertisement material, such as a video clip or text, which is associated with the programme that is to be shown when the advertisement is finished. The method may further involve recording a portion of the programme being broadcast immediately

30 before the start of the advertisement and displaying this to the user during the advertisement. Of course, in this case, the method preferably involves checking that the same programme is being continued after the advertisement is finished.

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The method may further involve monitoring programme changes; identifying the most recently provided or broadcast programme and presenting the most recently provided or broadcast programme to the user in

5   response to a channel change command. In this way, the most recently started programmes are automatically given priority during the zapping session.

The method may further involve receiving channel change commands from a remote control unit.

10 According to another aspect of the present invention, there is provided a system for controlling channel changes in a television or digital radio system having a digital tuner or receiver, the system comprising means for monitoring channel change commands

15 received from a user over a zapping session during which channels are discarded; means for identifying discarded channels; and means for preventing the tuner or receiver from returning to the discarded channels during the rest of the zapping session or unless it is

20 determined that a programme transmitted on the discarded channel has changed.

The means for identifying discarded channels may be configured to monitor a time for which the viewer viewed the channel and on the basis of this, determine

25 whether the channel is discarded. The system may further include means for setting a viewing time threshold for use in the step of determining whether the channel is to be discarded. Various options for using the threshold to determine whether or not a

30 channel is to be discarded may be employed. These options include: discarding the channel if the monitored viewing time is at most the viewing time threshold; retaining the channel if the monitored viewing time is at most the viewing time threshold;

discarding the channel if the monitored viewing time is at least the viewing time threshold, and retaining the channel if the monitored viewing time is at least the set viewing time threshold. The particular option that

5   is to be used can be selected as desired by the designer of the system. Alternatively, means may be provided for presenting to a user the various options that are available and receiving a user selection of one of the options.

10   The means for identifying discarded channels may comprise means for receiving from a user an indication of a programme or item type that is to be discarded; means for monitoring the type of programme currently being provided on available channels and means for

15   discarding from the channels that are available for zapping those channels that are currently broadcasting programmes or items of the type indicated by the user. The programme type may be, for example, sports programmes or current affairs programmes or

20   advertisements.

The system may further comprise means for determining whether a programme on a particular channel has changed. The means for determining whether a programme has changed may be operable to compare

25   programme identifiers for the previously scanned channel and the programme currently available. In the event that there is a match, then it is determined that the programme has not changed and so the channel is not re-introduced to a list of channels that are available

30   for scanning. In the event that there is not a match, then it is determined that the programme has changed. In this case, the channel is re-introduced into the list of channels that can be zapped to.

Additionally or alternatively, the means for determining whether a programme on a particular channel has changed may comprise means for monitoring real time; means for identifying programme scheduling
5   information for a particular channel and means for using the scheduling information and real time to determine whether there is a change in the currently broadcast programme.

The system may be adapted to receive a control
10   signal from the user that indicates that a channel zapping session is starting, this signal prompting the start of the step of monitoring the channels zapped to and those discarded. The system may be further adapted to include a receiver for receiving from a user a
15   signal that is indicative of a command to stop the channel zapping session.

Means may be provided for terminating the channel zapping session if no channel change commands are received after a pre-determined time has elapsed.

20   The system may be further configured to identify an advertisement, temporarily exclude the channel that the advertisement is being shown on from the pool of available channels and re-introduce the channel when the advertisement is finished. Alternatively, the
25   system may be configured to identify an advertisement and show in place of the advertisement material, such as a video clip or text, which is associated with the programme that is to be shown when the advertisement is finished. The system may further include means for
30   recording a portion of the programme being shown immediately before the start of the advertisement and displaying this to the user during the advertisement.

The system may be further configured to monitor programme changes; identify the most recently provided or broadcast programme and present the most recently provided or broadcast programme to the user in response
5 to a channel change command.

The system may further include a remote control unit for generating and sending channel change commands.

According to yet another aspect of the present
10 invention, there is provided a set-top box for controlling channel changes in a digital television or digital radio system having a digital tuner or receiver, the set top box being configured to monitor channel change commands received from a user over a
15 zapping session during which channels are discarded; identify discarded channels; and prevent the tuner or receiver from returning to the discarded channels during the rest of the zapping session or unless it is determined that a programme transmitted on the
20 discarded channel has changed.

According to yet another aspect of the present invention, there is provided a computer program preferably on a data carrier or a computer readable medium, for controlling channel changes in a digital
25 television or digital radio system having a digital tuner or receiver, the computer program having code or instructions for monitoring channel change commands received from a user over a zapping session during which channels are discarded; identifying discarded
30 channels; and preventing the tuner or receiver from tuning to the discarded channels during the rest of the zapping session or unless it is determined that a programme transmitted on the discarded channel has changed.
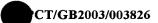
The code or instructions for identifying discarded
channels may comprise code or instructions for
monitoring a time for which the viewer viewed the
channel and on the basis of this, determining whether

5   the channel is discarded. The computer program may
include code or instructions for setting a viewing time
threshold for use in the step of determining whether
the channel is to be discarded. Various options for
using the threshold to determine whether or not a

10   channel is to be discarded may be employed. The choice
of which option to use can be made by the viewer or be
pre-determined. The computer program may be adapted to
discard the channel if the monitored viewing time is at
most the viewing time threshold or retain the channel

15   if the monitored viewing time is at most the viewing
time threshold or discard the channel if the monitored
viewing time is at least the viewing time threshold or
retain the channel if the monitored viewing time is at
least the set viewing time threshold. The code or

20   instructions for identifying discarded channels may
comprise code or instructions for receiving from a user
an indication of a programme or item type that is to be
discarded; monitoring the type of programme currently
being provided on available channels and discarding

25   those channels that are currently broadcasting
programmes or items of the type indicated by the user.
The programme type may be, for example, all sports
programmes or current affairs programmes or
advertisements.

30   The computer program may further comprise code or
instructions for determining whether a programme on a
particular channel has changed. The code or
instructions for determining whether a programme has
changed may be operable to compare programme

identifiers for the previously scanned channel and the programme currently available. In the event that there is a match, then it is determined that the programme has not changed and so the channel is not re-introduced
5   to a list of channels that are available for scanning. In the event that there is not a match, then it is determined that the programme has changed. In this case, the channel is re-introduced into the list of channels that can be zapped to. Additionally or
10   alternatively, the code or instructions for determining whether a programme on a particular channel has changed may comprise code or instructions for monitoring real time; identifying programme scheduling information for a particular channel and using the scheduling
15   information and real time to determine whether there is a change in the currently broadcast programme.

The computer programme may be adapted to receive a control signal from the user that indicates that a channel zapping session is starting, this signal
20   prompting the start of the step of monitoring the channels zapped to and those discarded. The code or instructions may be further adapted to receive from a user a signal that is indicative of a command to stop the channel zapping session.

25   The code or instructions may involve terminating the channel zapping session if no channel change commands are received over a pre-determined time.

The code or instructions may be operable to identify an advertisement, temporarily exclude the
30   channel that the advertisement is being shown on from the pool of available channels and re-introduce the channel when the advertisement is finished. Alternatively, the code or instructions may be operable to identify an advertisement and show in place of the

advertisement material, such as a video clip or text, which is associated with the programme that is to be shown when the advertisement is finished. The computer program may be operable to cause a portion of the programme being broadcast immediately before the start of an advertisement to be recorded and display portion of the programme to the user during the advertisement.

The computer program may be further adapted to monitor programme changes; identify the most recently provided or broadcast programme and cause the most recently provided or broadcast programme to be presented to the user in response to a channel change command.

Various aspects of the invention will now be described by way of example only and with reference to the accompanying drawings, of which:

Figure 1 is a block diagram of system that has an enhanced channel zapping capability;

Figure 2 is a flow diagram of the steps for switching into the enhanced channel zapping mode;

Figure 3 is a flow diagram of a top level process of the enhanced channel zapping capability;

Figure 4 is a flow diagram of a part of the process of Figure 3, and

Figure 5 is a flow diagram of a portion of the process of Figure 4.

Figure 1 shows a digital television 10 that includes enhanced channel-zapping functionality. The system of Figure 1 has a tuner 12, which is responsible for picking out the correct broadcast signal from the attached antenna 14 or cable distribution system. Connected to the tuner 12 is a demodulator 16 for producing a digital bit stream from the received signal. Connected to an output of the demodulator 16

is a meta-data extractor 18 for extracting from the demodulated bit stream a digital description of the TV channels included in that bit stream, as well as the TV programmes and/or items that are currently being or are

5   scheduled to be broadcast. This 'digital description' (or meta-data) can include any one of a number of programme identifiers. These will be described in more detail later.   After the meta-data extraction stage, the signal is passed to a video channel selector 20,

10   which selects from the bit stream the desired digital TV channel. Connected to the video selector 20 is a video rendering module 22 for converting the selected digital TV channel signal to a viewable format.   The output of the video-rendering module 22 is input to a
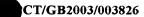
15   display 24, which is typically a television screen.

In order to control channel changes, a channel change mechanism 26 is provided. This is connected to and controls the tuner 12 and the video channel selector 20 to ensure that the selected TV channel is

20   received, decoded and displayed.   The channel change mechanism 26 receives channel change commands from a channel change mode switcher 28. The channel change mode switcher 28 receives control signals from a remote control signal receiver 30, which in turn receives

25   channel change signals from the user via a remote control unit 32, as shown. Alternatively, signals may also be received from "up" and "down" channel change controls on the front panel of the television.

Connected to the channel change mode switcher 28

30   is an enhanced zap mechanism 34.   This includes software for implementing enhanced zapping functionality.   In addition to forwarding routine channel changes to the channel change mechanism 26, the channel change mode switcher 28 is operable to switch

an enhanced zap mode on and off. When the enhanced zap mode is on, channel change commands are forwarded to the enhanced zap mechanism 34, instead of directly to the channel change mechanism 26. Associated with the zap mechanism 34 are a memory 36 for storing the pool of channels that are available during the channel zapping session and a digital clock 38. To switch between the different mechanisms, the channel change mode switcher 28 is responsive to commands received from the user.

Figure 2 shows the steps taken when the television is switched on initially. As is standard, the receiver 12 is powered-up 40; initialised 42; a list of available channels is identified 44, and the display 24 is initialised, i.e. the initial channel is picked and displayed on screen 46. The receiver 12 is then ready to receive channel change commands from the user. This can be done in two modes, these being "normal" and "enhanced zap". Typically, the default is the normal mode, with the enhanced zap mode being activated in response to a user command.

To allow the generation of the "enter enhanced zap" command, the remote control is adapted to be able to send an enhanced zap control signal, which when received is recognised by the channel change mode switcher 28 and causes the enhanced zap mechanism 34 to be activated. Typically, the remote control 32 will have a dedicated enhanced zap button and the system is set up so that the enhanced zap button on the remote control is able to toggle between the enhanced zap mode and the normal mode. Optionally, this enhanced zap button may be operable to effect channel change commands for receipt by the enhanced zap mechanism, by for example being configured to have the effect of a

'channel up' button. Alternatively, another zap button
may be provided to have the effect of a channel change
button, typically a 'channel up' button.

When the television is switched on initially and
5   the enhanced zap mode is off, the channel change mode
switcher recognises 48 that the mode of operation is
the normal mode. Operation is then commenced 50 in the
normal mode. In this mode, signals from the remote
control unit are relayed via the channel change mode
10 switcher 28 to the channel change mechanism 26, which
causes the channel to be changed, as is normal.
However, when the enhanced zap mode is activated, the
channel change mode switcher 28 recognises this as a
switch mode command 52 and so switches to the enhanced
15 zap mode 54. Once this is done, signals from the
remote control unit are relayed by the channel change
mode switcher 28 to the enhanced zap mechanism 34. The
user can change 56 from enhanced zap mode at any stage
by causing the appropriate mode command to be sent.
20 This causes the mode switcher to switch to the normal
mode.

Details of the functionality provided by the
enhanced zap mechanism will be described in more detail
with reference to Figures 3 to 5. In essence, however,
25 when the enhanced zapping mode is activated, channel
change commands are not passed directly to the channel
change mechanism 28, but instead are sent via the
enhanced zap mechanism 34. The zap mechanism 34 is
operable to receive and monitor channel change commands
30 received from the user over a zapping session. Using
pre-determined criteria, the enhanced zap mechanism 34
determines which channels are of no interest to the
user. In the event that the user re-starts the channel
scan within the same zapping session, the enhanced zap

mechanism 34 only passes on the change channel commands for those channels that have not been discarded. In this way, the enhanced zap mechanism 34 prevents the tuner or receiver from returning to the discarded

5 channels during the rest of the zapping session or until it is determined that a programme transmitted on the discarded channel has changed.

Various methods can be used to identify the programmes that are of no interest to a viewer in a

10 single channel zapping session and determine when the channels showing these programmes can be re-introduced into the pool of channels available for channel hopping. In one case, the enhanced channel zapping mechanism 34 uses programme, or item, identifiers.

15 Modern digital TV transmission systems broadcast, or have the ability to broadcast, extra information concerning the current broadcast. This can include some form of digital description of the current broadcast, or a digital identifier for the programme or item being

20 broadcast. This identifier is synonymous with the programme or item currently being broadcast, i.e. the identifier unambiguously identifies the programme or item. The channel zapping mechanism 34 is operable to monitor the identifier associated with channels that

25 have been scanned and discarded by the user. This is done using data provided by the meta-data extraction module 18. The enhanced zap mechanism then prevents the tuner 12 from being re-tuned to these channels until either a pre-set time has elapsed or the

30 programme identifier has changed.

A non-exhaustive list of identifiers includes the content reference ID (CRID) from the TV-Anytime forum; the instance meta-data identifier (IMDI) from the TV-Anytime forum; any URI, URN or URL as defined in any of
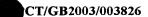
the IETF RFC documents; the DAVIC/DVB URL format; the DVB event ID; the SMPTE UPID and UMID and the ISO ISAN and V-ISAN.

In another method, it is possible to identify
5 programmes that are of no interest to a viewer and determine when the channels showing these programmes can be re-introduced into the pool of channels using event information tables (EIT). For DVB digital television, it is mandatory to transmit event
10 information tables (EIT) to tell the DVB television receiver about the current and next item, event or programme to be shown on a DVB service. When the EIT is used in this way it is known as the 'present/following' table. Its primary use is to help with channel hopping.
15 It allows an on-screen display to inform the user that, "Programme A is on now," and, "Programme B is on next." In this way, the user can see, at a glance, what the service is showing at present and what it will be showing next. EIT information is available for all
20 services in the DVB multiplex (that is, the transmitted MPEG transport stream). Also, present/following information is 'cross carried' on other multiplexes of the same operator. Thus, on any particular platform, it is not necessary to re-tune to access the
25 present/following information of a service carried within another multiplex.

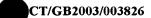In one method of enhanced channel zapping a list of all the DVB services that can be viewed is used. When the enhanced 'zapping' mode is engaged,
30 information associated with the elements of this list is used to determine whether a service is available for 'zapping' or 'channel hopping.' When the mode is engaged and a channel is selected, a flag associated with that service is set. This flag represents that the

channel has been zapped to. The present/following information for this service is noted. This service is now not available for channel hopping until either the present/following information for this service changes

5   or an optional time limit has expired.

In the DVB method described above in-band signalling is used to determine whether the current programme has changed. In an alternative method, TV schedule meta-data can be used. That is, the data that is broadcast within

10   the transport stream (TS) to allow the provision of an EPG. Examples of this data include DVB-SI, and the TV-Anytime Meta-data and Content Referencing specifications. In this case, the digital TV receiver maintains a database of the current TV schedule. The digital TV

15   receiver maintains an internal accurate clock based on data broadcast in the TS. Thus, the digital TV receiver is able to determine, in a time-based fashion, whether a programme is currently showing on air. In this case, when the enhanced zapping mode is engaged, information

20   associated with the elements of this list is used to determine whether a service is available for zapping or channel hopping. When the mode is engaged and a channel is selected, a flag associated with that service is set. This flag represents that the channel has been zapped to.

25   This service is now not available for channel hopping until the digital TV receiver determines that a new programme is showing or an optional time limit has expired. As before, when channels are zapped to, and discarded, they are removed from the pool of channels

30   that can be zapped to. These channels reappear in the pool of channels that can be zapped to as new programmes appear on them.

It is possible to extend the enhanced zapping functionality, from working at the programme level, to

also work at the programme item or segment level. When channel hopping, the viewer may regain interest in a channel if a new item is shown. For example, one news report may be of no interest, but the next may of

5   interest. This is possible using the TV-Anytime Meta- data specification, which allows the broadcaster to signal that an advertisement is currently showing. If the viewer zaps to a channel that is showing an advertisement and then moves to another channel before

10   the main programme resumes, then the viewer has not had the opportunity to assess whether or not the programme is of interest. In this case, the channel should not be removed from the pool of channels that can be zapped to.

15   In this implementation of the invention, the digital TV receiver maintains a list of the digital programme identifiers for the programmes or programme items showing on each of the digital TV services available.   This method of enhanced channel zapping

20   uses a list of all the digital TV services that can be viewed. When the enhanced zapping mode is engaged, information associated to the elements of this list is used to determine whether a service is available for zapping or channel hopping. When the mode is engaged

25   and a channel is selected, the digital programme identifier for the programme (or item) showing on this service is noted. This service is now not available for channel hopping until a new programme or item is showing (that is a new digital programme ID is

30   broadcast) or an optional time limit has expired. Thus, as channels are zapped to, and discarded, they are removed from the pool of channels that can be zapped to. These channels reappear in the pool of channels that can be zapped to as new programmes appear on them.

Each of the methods described above state that discarded channels reappear in the pool of channels that can be zapped to as new programmes appear on them. In a first further enhancement of the system, which will be

5 referred to as further enhancement 1, these channels are given priority. Thus, if a new programme or item appeared on a channel that was previously discarded, that channel will be selected the next time the viewer changes channel. Priority will be given to the newest programmes

10 and items. Thus, if a new programme or item appears on channel A and then, some time later, on channel B (where both channels A & B had been previously discarded) priority will be given to channel B and then channel A. As mentioned before, the enhanced zapping functionality

15 described herein can be achieved with a single 'zap' button, which would nominally have the effect of a 'channel up' button. When the first enhancement is implemented, i.e. the system gives priority to new programmes and items, hitting the zap button would

20 signify that the user wishes to see new content rather than the next channel in the channel list.

As a further enhancement, which will be referred to as further enhancement 2, the system may be adapted to allow the user to define the criteria under which

25 channels are discarded from and returned to the list of channels that can be 'zapped' to. For example, a time 'X' (in seconds) can be set by the user. A channel is only discarded if it is viewed for *at least* 'X' seconds. Otherwise, it is assumed that the channel was not

30 properly assessed, for example because an advertisement was showing at the time. Also, an optional time limit 'Y' (in minutes) can be set by the user. Once discarded, a channel is always returned to the pool of channels that can be 'zapped' to after 'Y' minutes, the pool of

available channels being stored in the memory 36 of Figure 1.

Alternatively or additionally; the system may be adapted to allow a user to discard particular types of
5   programme.   This will be referred to as further enhancement 3.   For example, the system may be operable to discard all sports channels or channels that are currently broadcasting sports programmes.   In this case, when a channel of a particular genre is discarded, all
10   other channels showing the same genre of programme can be discarded as well.   Alternatively, rather than discard these channels altogether, the system may be operable to give them a lower priority than channels showing programmes of other genres. In either case, when the
15   single zap button is used, pressing that 'zap' button allows the viewer to channel hop to programmes of other genres.

As a yet further enhancement, which will be referred to as further enhancement 4, if a channel is
20   currently showing an advertisement, the enhanced zap mechanism 34 may be operable to temporarily remove this channel from the pool of channels that can be zapped to. As soon as the advertisements have finished, the channel is restored, making it available for zapping
25   (and, hence, more permanent removal from the pool of channels if discarded by the viewer).   Another possibility is to show a stored clip of video when zapping to a channel that is currently showing an advertisement. In the case of an advertisement break
30   within a programme, the last minute or so of the programme (before the break started) could be shown. In the case of a break between programmes, the receiver could present a display of the digital description of the following programme (the programme meta-data). Or,

if it should be available to the receiver, a video clip from, or trailer for, the following programme could be shown.

A more specific description of the methodology for
5   implementing the invention will now be given with reference to Figures 3 to 5.

Figure 3 shows various steps for implementing enhanced zapping. These steps are all carried out in the enhanced zapping mechanism of Figure 1. When the
10 channel-zapping mode is entered, the first step 58 is to determine the initial channel to which the tuner 12 has to be tuned and various set up parameters. The first of these set-up parameters is a value for the optional timeout T1. The system is designed so that for any
15 discarded channel, after this optional timeout has expired, the channel is re-introduced into the pool of available channels. The timeout T1 can be set by either reverting to a default value stored in the memory 36 or by prompting the user to enter a value.

20   Once the optional timeout T1 is determined, it is established if new programmes are to be given priority,· i.e. whether further enhancement 1 is to be implemented. Then, the type of timing that is to be used to determine whether or not channels are to be discarded is
25 established, i.e. further enhancement 2, by either reverting to a stored value or by prompting the user to make the appropriate selection. If the "at least" option is chosen, then channels are discarded if they are viewed for at least the time set by the user. If the "at most"
30 option is selected, then channels are not discarded if they are viewed for at most the set time. Once the type of timing is selected, then the duration of the viewing time T2 is set. Again a default or pre-set value could be used or the user could manually enter a value.

Blocking of particular types of programme can also be set up at this stage, i.e. further enhancement 3, as can the option to exclude channels that are showing adverts from the available channel pool, i.e. further enhancement 4.

5   This set up routine can be done each time the user selects the enhanced zapping mode or alternatively, can be implemented using stored criteria.

Once the set-up parameters for the zapping session are identified, the tuner is tuned to the chosen channel

10   60.   To do this, the channel zapping mechanism sends a command to the channel change mechanism to cause the tuner to change to the first channel chosen by the user. The timer is then set to determine the amount of time the user views that channel 62.   Then the zapping mechanism

15   waits for an event to occur 64.   The events could be one of the following: expiry of the optional timeout T1; expiry of T2; a user input, such as a channel change command; end of programme or item on an excluded channel; start of an advert on one channel in the channel pool;

20   end of advert on one channel of the channel. pool.   Once an event is detected, it is processed 66.

Figure 4 shows the steps involved in the processing of an event, this processing being event dependent.   The first step of this is to determine whether the event is

25   expiry of T2.   If it is then the next step 70·is for the zapping mechanism to determine the type of timing selected at set up.   If the timing is "at most" then in the next step 72 it is determined that the current channel is not to be excluded when the next channel

30   change is made.   In contrast, if the timing is "at least", then the next step 74 is to exclude the current channel from the pool of available channels.   Hence, the pool of available channels stored in memory 36 of Figure 1 is up-dated to reflect that the current channel is

excluded. If the event is not expiry of T2, then it is determined in step 76 whether the event is timer T1 expiry for one channel. If the answer to this is yes, then at step 78 that channel is re-introduced to the pool

5   of available channels. Again, the pool of available channels stored in memory 36 of Figure 1 is up-dated to reflect this.

If the event is identified at step 80 as being a channel change command, then the current channel is

10   removed 82 from the available pool (if applicable) and the new channel is obtained 84. Figure 5 shows the steps for doing this in more detail. The zapping mechanism 34 firstly determines at step 102 whether the user input is a channel up or a channel down command. In the case

15   where it is a channel up command, the new channel is identified in step 104 as being the channel in the pool of available channels that is immediately after the current channel. In the case where it is a channel down command 106, the new channel is identified in step 108 as

20   being the channel in the pool of available channels that immediately precedes the current channel. If the user input is identified at step 110 as being a "zap" signal, the zapping mechanism finds 112 the channel that is the newest addition to the channel pool, that is the channel

25   that is showing the most recently started programme or item. In any case, once the channel change command is received and interpreted by the zapping mechanism 34, the final step 114 is to send the appropriate control signal to the channel change mechanism 26, which in turn sends a

30   channel change command to the tuner 12.

Returning to Figure 4, if the zapping mechanism identifies at step 88 that the event is the end of a programme or item on a channel excluded from the channel pool, then this channel is re-included 90 in the pool.

If the zapping mechanism identifies 92 the start of an advertisement on a channel in the channel pool, then this channel is temporarily excluded 94 from the pool. If the event that is identified is the end of an advertisement

5   96, the zapping mechanism re-introduces, at step 98, the channel to the channel pool.

In any case, after an event is processed, the next step 100 is to wait for further events. The above-described process of monitoring events such as user

10   inputs and changes of television programme and reacting to these events to change the pool of available channels continues until the user exits the zapping mode and returns to a normal viewing mode.

Whilst the system 10 of Figure 1 is described as

15   being included in a single self-contained enclosure such as a digital television, it will be appreciated that the channel-zapping functionality may be built into a set top box. In this case, all elements of the receiver circuitry would be within the same enclosure,

20   but the display would be provided within a separate unit, for example a television set.

The channel zapping mechanism of the present application uses the digital TV receiver to perform part of the channel hopping task. When channel hopping

25   up and down, people are aware of what they have 'hopped to' in the past and go into 'fast thumb' mode. This invention exploits the digital data available in the broadcast to make the process easier.

The channel zapping method described herein allows

30   the user to benefit from not having to 'channel hop' through channels showing programmes (or programme items) that he is not interested in. This is particularly advantageous for digital television

systems where the number of channels and channel change times are very much greater than for analogue systems.

A skilled person will appreciate that variations of the disclosed arrangements are possible without departing
5 form the invention. For example, whilst the description generally refers to programmes being broadcast, it will be appreciated that other ways for transmitting these could equally be used. Also, whilst the invention has been described with reference to television, it will be
10 appreciated that it could equally be applied to digital radio. Accordingly, the above description of a specific embodiment is made by way of example only and not for the purposes of limitation. It will be clear to the skilled person that minor modifications may be made without
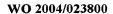15 significant changes to the operation described.

Claims

1. A method for controlling channel changes in television or digital radio having a tuner or receiver,
5 the method involving monitoring channel change commands received from a user over a zapping session during which channels are discarded; identifying discarded channels; and preventing the tuner or receiver from returning to the discarded channels during the rest of
10 the zapping session or unless it is determined that a programme transmitted on the discarded channel has changed.

2. A method as claimed in claim 1, wherein the step of
15 identifying discarded channels involves monitoring a time for which the viewer viewed the channel and on the basis of this, determining whether the channel is discarded.

20 3. A method as claimed in claim 2, comprising setting a viewing time threshold for use in the step of determining whether the channel is to be discarded.

4. A method as claimed in claim 3, wherein if the
25 monitored viewing time is at most the viewing time threshold, then the channel is discarded.

5. A method as claimed in claim 3, wherein if the monitored viewing time is at most the viewing time
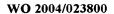30 threshold, then the channel is retained.

6. A method as claimed in claim 3, wherein if the monitored viewing time is at least the viewing time threshold, then the channel is discarded.

5   7. A method as claimed in claim 3, wherein if the monitored viewing time is at least the set viewing time threshold, then the channel is retained.

8. A method as claimed in any one of claims 3 to claim
10 7 comprising receiving a user input indicative of the times set.

9. A method as claimed in any one of the preceding claims, wherein the step of identifying discarded
15 channels involves receiving from a user an indication of a programme or item type that is to be discarded; monitoring the type of programme currently being provided on available channels and discarding those channels that are currently broadcasting programmes or
20 items of the type indicated by the user.

10. A method as claimed in claim 9, wherein the programme type is sports programmes and/or current affairs programmes and/or advertisements.
25

11. A method as claimed in any one of the preceding claims comprising determining whether a programme on a particular channel has changed.

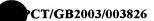30 12. A method as claimed in claim 11, wherein the step of determining whether a programme has changed comprises

comparing programme identifiers for the previously
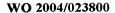viewed channel and the programme currently available.

13. A method as claimed in any one of the preceding
5   claims, wherein the step of determining whether a
programme on a particular channel has changed involves
monitoring real time; identifying programme scheduling
information for a particular channel and using the
scheduling information and real time to determine
10   whether there is a change in the currently broadcast
programme.

14. A method as claimed in any one of the preceding
claims involving receiving a control signal from the
15   user that indicates that a channel zapping session is
starting, this signal prompting the start of the step
of monitoring the channels zapped to and those
discarded.

20   15. A method as claimed in any one of the preceding
claims, wherein the method involves receiving from a
user a signal that is indicative of a command to stop
the channel zapping session.

25   16. A method as claimed in any one of the preceding
claims comprising terminating the channel zapping
session if no channel change commands are received over
a pre-determined time.

30   17. A method as claimed in any one of the preceding
claims comprising identifying an advertisement,
temporarily excluding the channel that the
advertisement is being shown on from the pool of

available channels and re-introducing the channel when the advertisement is finished.

18. A method as claimed in any one of claims 1 to 17 comprising identifying an advertisement and showing material, such as a video clip or text, which is associated with the programme that is to be shown when the advertisement is finished.

19. A method as claimed in claim 15 further involving recording a portion of the programme shown immediately preceding the advertisement and displaying this to the user during the advertisement.

20. A method as claimed in claim 19 comprising carrying out the step of recording for all available channels.

21. A method as claimed in any one of the preceding claims comprising monitoring programme changes; identifying the most recently provided or broadcast programme and presenting the most recently provided or broadcast programme to the user in response to a channel change command.

22. A system for controlling channel changes in television or digital radio having a tuner or receiver, the system comprising means for monitoring channel change commands received from a user over a zapping session during which channels are discarded; means for identifying discarded channels; and means for preventing the tuner or receiver from tuning to the discarded channels during the rest of the zapping
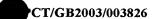
session or unless it is determined that a programme
transmitted on the discarded channel has changed.

23. A system as claimed in claim 22, wherein the means
5   for identifying discarded channels comprise means for
monitoring a time for which the viewer viewed the
channel and on the basis of this, determining whether
the channel is discarded.

10 24. A system as claimed in claim 23, comprising means
for setting a viewing time threshold for use by the
means for determining whether the channel is to be
discarded.

15 25. A system as claimed in claim 24, wherein if the
monitored viewing time is at most the viewing time
threshold, then the channel is discarded.

26. A system as claimed in claim 24, wherein if the
20 monitored viewing time is at most the viewing time
threshold, then the channel is retained.

27. A system as claimed in claim 24, wherein if the
monitored viewing time is at least the set viewing time
25 threshold, then the channel is discarded.

28. A system as claimed in claim 24, wherein if the
monitored viewing time is at least the set viewing time
threshold, then the channel is retained.

30

29. A system as claimed in any one of claims 23 to claim 28 comprising means for receiving a user input indicative of the times set.

5   30. A system as claimed in any one of claims 22 to 29, wherein the means for identifying discarded channels are operable to receive from a user an indication of a programme or item type that is to be discarded; monitor the type of programme currently being provided on
10   available channels and discard those channels that are currently broadcasting programmes or items of the type indicated by the user.

31. A system as claimed in claim 29, wherein the
15   programme type is sports programmes and/or current affairs programmes and/or advertisements.

32. A system as claimed in any one of claims 22 to 31 comprising means for determining whether a programme on
20   a particular channel has changed.

33. A system as claimed in claim 32, wherein the means for determining whether a programme has changed comprise means for comparing programme identifiers for
25   the previously viewed channel and the programme currently available.

34. A system as claimed in any one of claims 22 to 33, wherein the means for determining whether a programme
30   on a particular channel has changed are operable to monitor real time; identify programme scheduling information for a particular channel and use the scheduling information and real time to determine

whether there is a change in the currently broadcast programme.

35. A system as claimed in any one of claims 22 to 34 comprising means for receiving a control signal from the user indicative of the start of a channel zapping session, means for recognising the signal as a zapping session identifier and activating the means for monitoring the channels zapped to and those discarded in response to the zapping command.

36. A system as claimed in any one of claims 18 to 28, comprising means for receiving from a user a signal that is indicative of a command to stop the channel zapping session.

37. A system as claimed in any one of claims 18 to 29 comprising means for terminating the channel zapping session if no channel change commands are received over a pre-determined time.

38. A system as claimed in any one of claims 18 to 30 comprising a display for showing the programmes on.

39. A system as claimed in any one of claims 18 to 31 being adapted to receive channel change commands from a remote control.

40. A computer program, preferably on a data carrier or some other computer readable medium, for controlling channel changes in a television or digital radio having a tuner or receiver, the computer programme having code

or instructions for monitoring channel change commands received from a user over a zapping session during which channels are discarded; identifying discarded channels; and preventing the tuner or receiver from

5   tuning to the discarded channels during the rest of the zapping session or unless it is determined that a programme transmitted on the discarded channel has changed.

10   41. A computer program as claimed in claim 40, wherein the code or instructions for determining discarded channels are operable to monitor a time for which the viewer viewed the channel and on the basis of this, determine whether the channel is discarded.

15

      42. A computer program as claimed in claim 41, comprising code or instructions for setting a viewing time threshold for use by the means for determining whether the channel is to be discarded.

20

      43. A computer program as claimed in claim 42, wherein if the monitored viewing time is at most the viewing time threshold, then the channel is discarded.

25   44. A computer program as claimed in claim 42, wherein if the monitored viewing time is at most the viewing time threshold, then the channel is retained.

      45. A computer program as claimed in claim 42, wherein

30   if the monitored viewing time is at least the set viewing time threshold, then the channel is discarded.

46. A computer program as claimed in claim 42, wherein if the monitored viewing time is at least the set viewing time threshold, then the channel is retained.

5 47. A computer program as claimed in any one of claims 40 to 46comprising code or instructions for receiving a user input indicative of the times set.
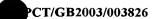
48. A computer program as claimed in any one of claims
10 40 to 48, wherein the code or instructions for identifying discarded channels are operable to receive from a user an indication of a programme or item type that is to be discarded; monitor the type of programme currently being provided on available channels and
15 discard those channels that are currently broadcasting programmes or items of the type indicated by the user.

49. A computer program as claimed in claim 48, wherein the programme type is sports programmes and/or current
20 affairs programmes and/or advertisements.

50. A computer program as claimed in any one of claims 40 to 49comprising code or instructions for determining whether a programme on a particular channel has
25 changed.

51. A computer program as claimed in claim 50, wherein the code or instructions for determining whether a program has changed are operable to compare program
30 identifiers for the previously viewed program and the program currently available.

52. A computer program as claimed in any one of claims 40 to 51, wherein the code or instructions for identifying whether a programme on a particular channel has changed are operable to monitor real time; identify programme scheduling information for a particular channel and using the scheduling information and real time to determine whether there is a change in the currently broadcast programme.

53. A computer program as claimed in any one of claims 40 to 51 comprising code or instructions for receiving a control signal from the user that indicates that a channel zapping session is starting, this signal prompting the start of the step of monitoring the channels zapped to and those discarded.

54. A computer program as claimed in any one of claims 40 to 53, wherein the code or instructions are operable to receive from a user a signal that is indicative of a command to stop the channel zapping session.

55. A computer program as claimed in any one of claims 40 to 54 comprising code or instructions for terminating the channel zapping session if no channel change commands are received over a pre-determined time.

56. A set top box that includes a system or computer program as defined in the preceding claims.

57. A television system that includes a system or computer program as defined in the preceding claims.

58. A digital radio that includes a system or computer program as defined in the preceding claims.

5   59. A method substantially as described hereinbefore with reference to the accompanying drawings.

60. A system substantially as described hereinbefore with reference to the accompanying drawings and as 10   shown in Figure 1.

61. A computer program substantially as described hereinbefore with reference to the accompanying drawings.

15

1/5

Fig. 1

Fig. 2

Obtain initial channel to tune
receiver to. Also determine,

- Value for timer T1 (optional time-out)
- If Further Enhancement 1 is used
- Type of timing for elapsed viewing time ("**at most**" or "**at least**") if Further Enhancement 2 is used
- Value for timer T2 (for above)
- If Further Enhancement 3 is used
- If Further Enhancement 4 is used

58

60

Tune receiver to chosen channel

62

Set timer T2 (Elapsed viewing
time) if further Enhancement 2.

Wait for event, this could be one
of;

- Timer T1 expiry
- Timer T2 expiry (for one of the excluded channels)
- User input (channel change signal)
- End of programme or programme item on one excluded channel
- Start of advert on one channel in channel pool
- End of advert on one channel in advert pool

64

Process event (see Figure 4).
Channel to be changed?

no

66

yes

Fig. 3

68 — Event is timer T2 expiry for current channel?(If using Further Enhancement 2) — yes → What kind of timing for Further Enhancement 2 — 70

"at most" / "at least"

72 — Current channel **not** to be excluded on channel change

74 — Current channel **is to be** excluded on channel change

no

76 — Event is timer T1 expiry for one channel excluded from "channel pool"? (This is re-inclusion of a channel after an optional time-out.) — yes → Channel to be re-included in the "channel pool" — 78

no

80 — User input-channel change signal from viewer? — yes → Remove current channel from channel pool (if applicable) — 82

Get new channel (see Figure 5) — 84

Tune to new channel (see Figure 3, box 60) — 86

no

88 — End of programme or programme item on channel excluded from "channel pool?" — yes → Re-include this channel in the "channel pool" — 90

no

92 — Start of advertisement on channel **in** the "channel"? (For Further Enhancement 4.) — yes → Temporarily exclude this channel from the "channel pool" (Place in "advert pool.") — 94

no

96 — End of advertisement on a channel in the "advert pool." (For Further Enhancement 4.) — yes → Re-include this channel in the "channel pool" — 98

no

100 — Wait for event (see Figure 3, box 64)

Fig. 4

Fig. 5

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7   H04N5/50   H03J1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7   H04N   H03J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ, WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 03, 3 April 2002 (2002-04-03) & JP 2001 309253 A (MATSUSHITA ELECTRIC IND CO LTD), 2 November 2001 (2001-11-02)	1,22,40
A	abstract ---	9,30,48
A	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 03, 3 April 2002 (2002-04-03) & JP 2001 326862 A (SHARP CORP), 22 November 2001 (2001-11-22) abstract ---	1,9,22, 30,40,48
A	US 6 411 343 B1 (HANCOCK KENNETH S ET AL) 25 June 2002 (2002-06-25) column 1, line 65 -column 2, line 24 -----	1,22,40

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 November 2003	04/12/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Fuchs, P

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 2001309253	A	02-11-2001	NONE	
JP 2001326862	A	22-11-2001	NONE	
US 6411343	B1	25-06-2002	US 2003128300 A1	10-07-2003